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2613	

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/088,503	Applicant(s) YAMANAKA ET AL.
	Examiner Christina Y. Leung	Art Unit 2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2006 and 19 Septemeber 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on 21 June 2006 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Archambault (US 6,567,196 B1) in view of Tomonaga et al. (US 5,878,025 A) and Kosaka (US 5,675,432 A).

Regarding claim 1, Archambault discloses an optical wavelength division multiplexing and transmission apparatus (Figure 12), comprising

a first optical wavelength multiplexer (comprising combiners 1211, 1212, and filtering element 1221) to multiplex a group of prescribed optical wavelength signals with each other and to output a first multiplexed signal (on line 1241);

a synthetic optical wavelength multiplexer 1231 to multiplex the first multiplexed signal (on line 1241) and a second multiplexed signal (on line 1242) and to output a synthetic multiplexed signal; and

a second optical wavelength multiplexer (comprising combiners 1213-1215 and filtering elements 1222 and 1223) to multiplex a group of optical wavelength signals having a wavelength distribution that is different from that of the group of prescribed optical wavelength signals and to output as the second multiplexed signal (on line 1242).

Archambault further discloses that a number of the optical wavelength signals multiplexed is divided in advance into a plurality of groups. Specifically, Archambault discloses dividing a large group of wavelengths into smaller groups so that existing smaller multiplexing components (1 x 8 components, for example) may be more conveniently utilized and the overall system minimizes power loss (column 1, lines 54-67; column 2, lines 1-11).

Further regarding claim 1, Archambault does not specifically disclose a master rack and at least a slave rack to be combined with the master rack. However, Tomonaga et al. teach that racks are commonly used to physically support and organize components in optical communications systems, and further teach that they may advantageously allow expansion of different parts of the communication system when a number of connections/wavelengths is increased (column 31, lines 47-67; column 32, lines 1-4). It would have been obvious to a person of ordinary skill in the art to use different racks as taught by Tomonaga et al. to support the first and second multiplexers in the system disclosed by Archambault in order to modularize the sub-multiplexers and allow the system to be easily expanded to accommodate wavelengths as they are added to the communication system. Archambault already discloses that the disclosed multiplexer system is divided into smaller components and is designed to be readily expandable by adding additional multiplexers to be combined with the first and second multiplexer at the synthetic multiplexer (column 8, lines 50-51).

Further regarding claim 1, Archambault in view of Tomonaga et al. do not further suggest an amplifier in which the synthetic multiplexed signal output from the synthetic optical wavelength multiplexer is multiplied. However, Kosaka teaches a system related to the one described by Archambault in view of Tomonaga et al. including wavelength division multiplexing optical signals (Figure 4). Kosaka further teaches amplifying the output of the multiplexer (using element 9; column 5, lines 28-45). It would have been obvious to a person of ordinary skill in the art to include at least an additional amplifier as taught by Kosaka in the system described by Archambault in view of Tomonaga et al. in order to amplify the output signal and ensure that the multiplexed signal is transmitted at a desired level for proper reception.

4. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Archambault in view of Tomonaga et al. and Kosaka as applied to claim 1 above, and further in view of Takeda et al. (US 6,091,538 A).

Regarding claim 4, Archambault in view of Tomonaga et al. and Kosaka describe a system as discussed above with regard to claim 1. Archambault does not specifically disclose a plurality of noise cut filters corresponding to the first and second multiplexed signals. However, Archambault does disclose that substantially uniform channel power is desired in a wavelength division multiplexed system (column 9, lines 43-48). Furthermore, Takeda et al. teach a WDM system related to the one disclosed by Archambault including first and second multiplexers 12 and 14 whose outputs are combined at a synthetic multiplexer 22 (Figure 1) and further teach an amplifier 18 for amplifying the output of the second multiplexer. Takeda et al. also teach a plurality of noise cut filters 20 corresponding to the first multiplexed signal and the second multiplexed signal respectively on an input side of the synthetic optical wavelength multiplexer

22 on which the first multiplexed signal and second multiplexed signal are input for eliminating noise caused by the optical amplifiers (column 2, lines 60-66). Figure 1 explicitly shows only one filter 20, but Takeda et al. teach that filters may be used on both the first and the second multiplexer outputs (column 3, lines 43-47).

Regarding claim 4, it would have been obvious to a person of ordinary skill in the art to include an amplifier at the output of the second multiplexer and to include filters as taught by Takeda et al. in the system described by Archambault in view of Tomonaga et al. and Kosaka in order to equalize the groups of multiplexed signals relative to each other (Takeda et al., column 1, lines 51-67) and obtain substantially uniform channel power (as already suggested by Archambault) without increasing noise in the signals.

Regarding claim 8, Archambault in view of Tomonaga et al. and Kosaka describe a system as discussed above with regard to claim 1, and Kosaka additionally teaches including a wavelength level monitoring device (control unit 14) for monitoring an output of the multiplexer 19 (Kosaka, Figure 4). It would have been obvious to a person of ordinary skill in the art to include a wavelength level monitoring device as taught by Kosaka in the system already described by Archambault in view of Tomonaga et al. and Kosaka in order to get feedback information to enable the optimization of the amplification of the signals relative to each other.

Further regarding claim 8, Archambault does not specifically disclose an optical amplifier for the first and second multiplexed signals but does disclose that substantially uniform channel power is desired in a wavelength division multiplexed system (column 9, lines 43-48). Furthermore, Takeda et al. teach a WDM system related to the one disclosed by Archambault including first and second multiplexers 12 and 14 whose outputs are combined at a synthetic

multiplexer 22 (Figure 1) and further teach amplifiers 16 and 18 for first and second multiplexed signals respectively.

Regarding claim 8, it would have been obvious to a person of ordinary skill in the art to include amplifiers at the outputs of the first and second multiplexers as taught by Takeda et al. in the system described by Archambault in view of Tomonaga et al. and Kosaka in order to equalize the groups of multiplexed signals relative to each other (Takeda et al., column 1, lines 51-67) and obtain substantially uniform channel power as already suggested by Archambault.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Archambault in view of Tomonaga et al. and Kosaka as applied to claim 1 above, and further in view of Yamamoto et al. (US 6,021,235 A).

Regarding claim 6, Archambault in view of Tomonaga et al. and Kosaka describe a system as discussed above with regard to claim 1 but do not specifically disclose or suggest a plurality of dispersion compensation fibers. However, Yamamoto et al. teach a system related to the one described by Archambault in view of Tomonaga et al. and Kosaka including wavelength division multiplexing optical signals (Figure 9). Yamamoto et al. further teaches a plurality of dispersion compensation fibers 3 corresponding to the inputs of a wavelength multiplexer. It would have been obvious to a person of ordinary skill in the art to include a plurality of dispersion compensation fibers as taught by Yamamoto et al. at the inputs of the multiplexer in the system described by Archambault in view of Tomonaga et al. and Kosaka in order to mitigate the effects of dispersion and thereby more effectively transmit the signals.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Archambault in view of Tomonaga et al. and Bastien (US 6,307,668 B1).

Regarding claim 2, Archambault discloses an optical wavelength division multiplexing and transmission apparatus (Figure 1), comprising:

synthetic optical wavelength demultiplexer (comprising splitter 110 and filtering elements 125-1 and 130-1) to input a synthetic multiplexed signal formed by multiplexing respective multiplexed signals of a group of different optical wavelength, which are grouped with different optical wavelength distributions and to demultiplex and output a first multiplexed signal and a second multiplexed signal (as outputs from filtering element 125-1 and filtering element 130-1, for example);

a first optical wavelength demultiplexer 135-1 to demultiplex and output a group of optical wavelength signals from the first multiplexed signal demultiplexed by the synthetic optical wavelength demultiplexer; and

a second optical wavelength demultiplexer 140-1 to demultiplex and output another group of optical wavelength signals from the second multiplexed signal demultiplexed by the synthetic optical wavelength demultiplexer.

Archambault further discloses that a number of the optical wavelength signals multiplexed is divided in advance into a plurality of groups. Specifically, Archambault discloses dividing a large group of wavelengths into smaller groups so that existing smaller multiplexing components (1 x 8 components, for example) may be more conveniently utilized and the overall system minimizes power loss (column 1, lines 54-67; column 2, lines 1-11).

Again, Archambault further does not specifically disclose a master rack and at least a slave rack possible to be combined with and coupled to the master rack. However, Tomonaga et al. teach that racks are commonly used to physically support and organize components in optical

communications systems, and further teach that they may advantageously allow expansion of different parts of the communication system when a number of connections/wavelengths is increased (column 31, lines 47-67; column 32, lines 1-4). It would have been obvious to a person of ordinary skill in the art to use different racks as taught by Tomonaga et al. to support the first and second demultiplexers in the system disclosed by Archambault in order to modularize the sub-demultiplexers and allow the system to be easily expanded to accommodate wavelengths as they are added to the communication system. Archambault already discloses that the disclosed demultiplexer system is divided into smaller components and is designed to be readily expandable by adding additional demultiplexers to be combined with the first and second demultiplexer at the synthetic demultiplexer (column 5, lines 34-51).

Further regarding claim 2, Archambault in view of Tomonaga et al. do not further suggest an optical amplifier in which the second multiplexed signal output from the synthetic optical wavelength demultiplexer is multiplied.

However, Bastien teaches a system related to the one described by Archambault in view of Tomonaga et al. including wavelength division multiplexing optical signals (Figure 1). Bastien teaches demultiplexing a signal into different wavelength bands using a synthetic/band demultiplexer 18 and amplifying different wavelengths bands differently using an optical amplifier (one of the three EDFAs shown in Figure 1) in which a multiplexed signal output from the synthetic demultiplexer is multiplied. It would have been obvious to a person of ordinary skill in the art to include at least an additional amplifier to amplify an output of the synthetic demultiplexer as taught by Bastien in the system described by Archambault in view of

Tomonaga et al. in order to provide the optimal amplification of the signals based on their wavelength band and thereby ensure that the signals are at a proper level for reception.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. (US 6,041,152 A) in view of Tomonaga et al. and Kosaka.

Regarding claim 3, Clark et al. disclose an optical wavelength division multiplexing and transmission apparatus (Figures 1 and 3A), comprising:

a first optical wavelength multiplexer 4 to multiplex a group of prescribed optical wavelength signals with each other and to output a first multiplexed signal;

a synthetic optical wavelength multiplexer (part of DWDM combiner 1, comprising circulator 41 and filter 48 in Figure 3A) to multiplex the first multiplexed signal and a second multiplexed signal and to output a first synthetic multiplexed signal (to port 44 of circulator 41; column 6, lines 54-65);

a synthetic optical wavelength demultiplexer (part of DWDM combiner 1, comprising circulator 40 and filter 52 in Figure 3A) to demultiplex and output a third multiplexed signal and a fourth multiplexed signal from a second synthetic multiplexed signal transmitted from another optical wavelength division multiplexing and transmission apparatus through an optical transmission line (to ports 49 and 50 of circulator 40; column 7, lines 5-14);

a first optical wavelength demultiplexer 6 to demultiplex and output a group of optical wavelength signals from the third multiplexed signal output from the synthetic optical wavelength demultiplexer;

a second optical wavelength multiplexer 5 to multiplex a group of optical wavelength signals having a wavelength distribution that is different from that of the group of prescribed optical wavelength signals and to output as the second multiplexed signal; and

a second optical wavelength demultiplexer 7 to demultiplex and output another group of optical wavelength signals from the fourth multiplexed signal demultiplexed by the synthetic optical wavelength demultiplexer.

Clark further discloses that a number of the optical wavelength signals multiplexed is divided in advance into a plurality of groups. Specifically, Clark discloses dividing a large group of wavelengths into smaller groups so that existing smaller multiplexing components (1 x 4 components, for example) may be more conveniently utilized and the overall system thereby minimizes power loss (column 1, lines 53-59; column 2, lines 2-14).

Further regarding claim 3, Clark further does not specifically disclose a master rack and at least a slave rack possible to be combined with and coupled to the master rack. However, Tomonaga et al. teach that racks are commonly used to physically support and organize components in optical communications systems, and further teach that they may advantageously allow expansion of different parts of the communication system when a number of connections/wavelengths is increased (column 31, lines 47-67; column 32, lines 1-4). It would have been obvious to a person of ordinary skill in the art to use different racks as taught by Tomonaga et al. to support the first and second multiplexers in the system disclosed by Clark in order to modularize the sub-multiplexers and allow the system to be easily expanded to accommodate wavelengths as they are added to the communication system. Clark already discloses that the disclosed multiplexer/demultiplexer system is divided into smaller components

and is designed to be readily expandable by adding additional multiplexers and demultiplexers to be combined with existing first and second multiplexers and demultiplexers (column 7, lines 15-28).

Further regarding claim 3, Clark in view of Tomonaga et al. do not further suggest an amplifier in which the first synthetic multiplexed signal output from the synthetic optical wavelength multiplexer is multiplied. However, Kosaka teaches a system related to the one described by Archambault in view of Tomonaga et al. including wavelength division multiplexing optical signals (Figure 4). Kosaka further teaches amplifying the output of the multiplexer (using element 9; column 5, lines 28-45). It would have been obvious to a person of ordinary skill in the art to include at least an additional amplifier as taught by Kosaka in the system described by Clark in view of Tomonaga et al. in order to amplify the output signal and ensure that the multiplexed signal is transmitted at a desired level for proper reception.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of Tomonaga et al. and Kosaka as applied to claim 3 above, and further in view of Takeda et al.

Regarding claim 5, Clark in view of Tomonaga et al. and Kosaka describe a system as discussed above with regard to claim 3. Clark does not specifically disclose a plurality of noise cut filters corresponding to the first and second multiplexed signals. However, Takeda et al. teach a WDM system related to the one disclosed by Clark including first and second multiplexers 12 and 14 whose outputs are combined at a synthetic multiplexer 22 (Figure 1) and further teach an amplifier 18 for amplifying the output of the second multiplexer. Takeda et al. also teach a plurality of noise cut filters 20 corresponding to the first multiplexed signal and the second multiplexed signal respectively on an input side of the synthetic optical wavelength

multiplexer 22 on which the first multiplexed signal and second multiplexed signal are input for eliminating noise caused by the optical amplifiers (column 2, lines 60-66). Figure 1 explicitly shows only one filter 20, but Takeda et al. teach that filters may be used on both the first and the second multiplexer outputs (column 3, lines 43-47).

Regarding claim 5, it would have been obvious to a person of ordinary skill in the art to include an amplifier at the output of the second multiplexer and to include filters as taught by Takeda et al. in the system described by Clark in view of Tomonaga et al. and Kosaka in order to equalize the groups of multiplexed signals relative to each other without increasing noise in the signals (Takeda et al., column 1, lines 51-67).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of Tomonaga et al. and Kosaka as applied to claim 3 above, and further in view of Yamamoto et al.

Regarding claim 7, Clark in view of Tomonaga et al. and Kosaka describe a system as discussed above with regard to claim 3 but do not specifically disclose or suggest a plurality of dispersion compensation fibers. However, Yamamoto et al. teach a system related to the one described by Clark in view of Tomonaga et al. and Kosaka including wavelength division multiplexing optical signals (Figure 9). Yamamoto et al. further teaches a plurality of dispersion compensation fibers 3 corresponding to the inputs of a wavelength multiplexer. It would have been obvious to a person of ordinary skill in the art to include a plurality of dispersion compensation fibers as taught by Yamamoto et al. at the inputs of the multiplexer in the system described by Clark in view of Tomonaga et al. and Kosaka in order to mitigate the effects of dispersion and thereby more effectively transmit the signals.

Response to Arguments

10. Applicants' arguments with respect to claims 1-8 filed 21 June 2006 have been considered but are moot in view of the new ground(s) of rejection.

In response to Applicants' assertion on page 11 of their response that Archambault "teaches away" from the amplifier at the output of the synthetic demultiplexer currently recited in claim 1, Examiner respectfully notes that the sections of Archambault mentioned by Applicants to support this assertion ("column 1, line 64, through column 2, lines 5") are directed to the placing of amplifiers either at the input or outputs of a 1x40 splitter element. This splitter element is not what is disclosed by Archambault to be the synthetic demultiplexer as discussed in greater detail above with regard to claim 2. The synthetic demultiplexer disclosed by Archambault comprises splitter 110 and filtering elements 125-1 and 130-1 and outputs a first multiplexed signal and a second multiplexed signal as the outputs from filtering element 125-1 and filtering element 130-1, for example. In the combination of Archambault in view of Bastien, it is that "second multiplexed signal" from one of the filter elements that would be amplified, not the output of a 1x40 splitter discussed in a different context by Archambault.

In response to Applicants' arguments concerning claim 1 and also claim 3 that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. However, so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Applicants' disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Examiner respectfully

maintains that Kosaka teaches the use of an amplifier at the output of a multiplexer, as discussed in greater detail with regard to claims 1 and 3 above, in order to enable the output signal in a transmission system to be transmitted at a suitable level for proper reception.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 571-272-3023. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christina Y Leung
CHRISTINA LEUNG
PRIMARY EXAMINER